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ABSTRACT

A discussion of schema theory as it relates to the learning of English as a Second Language reviews related research and its implications for classroom instruction. The first section looks at schema theory in general and content schemata in particular, focusing on how they affect reading comprehension. Studies of non-native speakers, schema theory, and reading are reviewed, and some English classroom applications of what is known about schemata are recommended. A study using intermediate and advanced non-native speakers of English from East Asia is reported. The results of this study indicated that second-language readers, particularly those with intermediate reading proficiency, make use of prior knowledge in reading to compensate for inadequacies in proficiency and depend on content vocabulary in combination with prior knowledge to achieve comprehension. The discussion concludes with implications for the second-language classroom and recommendations for future research. It is recommended that teachers be aware of the prior knowledge required for the reading passages used in the classroom, and that additional classroom research addressing this issue be undertaken. (MSE)

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READING, SCHEMA THEORY AND SECOND LANGUAGE LEARNERS

S. Kathleen Kitao, PhD

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Introduction

In looking at comprehension, whether reading or listening comprehension, the traditional assumption is that these are skills in which the reader/listener passively absorbs what the writer/speaker has produced. However, over the past fifteen to twenty years, it has gradually come to be recognized that what have been traditionally referred to as passive skills do require active participation. The reader/listener's background knowledge interacts with input to arrive at comprehension. Starting with such theorists as Goodman (1967) and Smith (1971), the movement has been to include the reader in textual interpretations. This movement has not been restricted to psycholinguistics but is also reflected in counterparts in philosophy, psychology, communication and literary criticism. *Schema theory* has been developed to help explain how readers/listeners interact with the text to arrive at comprehension. For the purpose of this book, I am primarily concerned with reading. Since the emphasis in English language teaching has, to a great extent, been on the text rather than on the reader, this theory has important implications, not only in the first language but also for second or foreign language teaching and learning.

Schemata are knowledge structures made up of *slots* or *placeholders*. They include information about what can or must fill each slot and what the relationships are among the slots. A reader uses schemata to understand relationships among pieces of information and to fill in information that is not mentioned explicitly. Research with native English speakers has indicated that readers understand reading passages for which they have well-developed schemata better than those for which their schemata are not developed. However, research with nonnative speakers has been ambiguous. Some studies have indicated that second language readers make use of schemata when reading, but other researchers have found different results.

In the first chapter of this book, I look at schema theory, in particular

content schemata, and how they affect reading comprehension in general and the reading comprehension of nonnative speakers of English in particular. I review in detail studies that have been done on nonnative speakers, schema theory and reading and make recommendations on how what is known about schemata can be applied in the English language classroom. Since research methodology is an important issue related to schema theory, I also look at research methods and the particular issues related to research on English language learners and propose standards for research.

In order to better understand reading comprehension in nonnative speakers as related to prior knowledge and lexical proficiency, I did a study using intermediate and advanced nonnative speakers of English from East Asia. The methodology of the study and the results are described in the second and third chapters. I measured their prior knowledge on three topics and their comprehension of three reading passages related to those topics. I also measured their lexical and reading proficiency.

The results of the study indicated that second language readers, particularly those with intermediate reading proficiency, make use of prior knowledge in reading. They use prior knowledge to make up for inadequacies in their reading proficiency. The results also indicated that readers depend on content vocabulary, which they use together with prior knowledge, to achieve comprehension.

In the fourth chapter, I conclude with a discussion of implications for the second language classroom and recommendations for future research. The results of this and other studies indicate that it is important for teachers in the classroom to be aware of the prior knowledge required for the reading passages that they use. Students' difficulties in comprehension may be related not only to linguistic or lexical problems but also to problems related to lack of prior knowledge. More classroom-based research is necessary to find out how this can best be handled.

* * * * * * *

This book was my PhD dissertation, *Contributions of Schemata to the Reading Comprehension of East Asian Readers of English as a Second Language*, which was submitted to the Graduate School of Michigan State University in March, 1988. It has been revised slightly to reduce the technicality and to make it easier for Japanese audiences to read. I am pleased that Eichosha Shinsha has agreed to publish it so that it will be available to interested readers in Japan. My main purpose for doing research is to further English education in Japan, so I hope that English teachers here will be able to use this information to teach reading more effectively.

I would like to thank the members of my committee at Michigan State University, Dr. Jack Bain, Dr. Mary Bresnahan, Dr. Paul Munsell, and Dr. James Stiff, for their advice, direction, and support in the writing of my dissertation. I would also like to express my appreciation to the 116 participants in this study, to my research assistants, Mike Chaido, Mike Israel, Angenette Lynch, Susan Matthews, Phillip Peters, Tom Slater, and Lorenzo White, who helped with the collecting and coding of the data and to Prof. James Swan of Baika Women's College, who read the manuscript and made comments. Finally, I would like to thank my husband, Kenji Kitao, without whose advice and support this dissertation would not have been possible.

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Kyoto, Japan
January, 1989

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CHAPTER 1

READING AND SCHEMA THEORY

Schema Theory

Background

As far back as Kant (1781), it has been asserted that background knowledge plays a part in comprehension. Bartlett (1932) developed *schema theory* to explain how background knowledge is used by a reader/listener to understand and recall a text. Bartlett found that when participants read a story from an unfamiliar culture, their memory of the story changed over time to fit schemata from their own culture. Yet it was not until four decades later that there was wide interest in Bartlett's theories.

Literary criticism is one field in which there has been interest in the contribution that the reader makes to comprehension. The school called reader response criticism in particular has emphasized this aspect of reading. Jackson (1947) dealt extensively with the concept of the reader as "artist," and discussed reading in terms of the contribution that the reader makes to the creative process. Iser (1978: 24), an influential thinker in reader response criticism, wrote:

> Although it is clear that acts of comprehension are guided by the structure of the text, the latter can never exercise complete control.... (The reader) participates in both the production and comprehension of the work's intention.

In the mid-1970's, there was a revival of interest among psycholinguists and scholars in other areas in Bartlett's research and theories. Researchers again began looking at the influence of background knowledge and the organization of texts on comprehension, particularly reading comprehension.

Definition of Schema

Schemata are highly organized, generic knowledge structures composed of *slots* or *placeholders* for each component (den Uyl and van Oostendorp, 1980; Anderson, Reynolds, Schallert, and Goetz, 1977). Two broad types of schemata are *content schemata* and *textual schemata.* Content schemata contain general or specific information on a given topic. Textual schemata contain information about how rhetoric is, or ought to be, organized.

In addition to slots, a schema includes information about constraints on what can normally fill a particular slot (Anderson, 1978) and what the relationships are among the slots (Graesser, Woll, Kowalski, and Smith, 1980). A schema includes the network of associations that a concept has (Pearson and Spiro, 1982). This process of filling the slots is called *instantiation* of a schema (Anderson, 1978). In addition to information about constraints on what can fill a slot, schemata include default values for each slot. Therefore, if no information is available to fill a slot, the reader/listener fills the slot with a value that he/she knows to be typical in that slot. Schemata are hierarchically organized, from most important information at the top, down to the least important information (Anderson, 1978).

Event Schemata

One specialized type of content schema is the *event schema*, also referred to by Schank and Abelson (1977) as a *script*. Like other schemata, event schemata are knowledge structures composed of slots labeled according to what may or must fill the slots. Event schemata contain information about stereotypical events or situations, such as eating in a restaurant or visiting the office of a medical professional. The unique characteristic of event schemata is that they are organized temporally (Schank and Abelson, 1977; Abelson, 1981). Event schemata specify the expected time ordering of events. I will use event schemata to explain how schemata are believed to function.

An event schema (script) for going to a restaurant would include information about servers, menus, paying the bill, and so on (Bower, Black, and Turner, 1979). The event schema would include the information that there must be a server; that the server can be male or female; that there must be a menu, whether it is a printed menu given to customers or a sign posted on the wall; that the menu will most likely have prices. In addition to a basic restaurant schema, there are restaurant schemata for specific types of restaurants, for example, fancy restaurants, cafeterias, and fast food establishments. These specific event schemata might include the information that in a fancy restaurant, the server is likely to be male and that the prices might be omitted, on at least some of the menus.

Uses of Schemata

Schemata are used mainly in two ways (Bower, Black, and Turner, 1979). The first is in guiding actions in typical situations. For example, a customer entering a restaurant knows how to behave, based on event schemata. The customer knows that, for example, when eating at a sit-down restaurant, the server will bring a menu and then leave, that the customer should look at the menu and decide what to eat, and that the server will be back to take the order.

For the purpose of this book, I am interested in the second use of schemata — comprehension, especially as applied to reading. Schemata allow the reader to make inferences and fill in information not explicitly included in the text (Anderson, 1978). This makes it unnecessary for a writer to include every detail that the reader needs to know. The reader makes inferences based on the information that is given and on information from the schema, whether from default values or from relationships that are specified among slots. For example, when eating at a restaurant is mentioned in a text, the reader uses schemata to fill in details that are not specifically mentioned and to make inferences based on the information that is given. If a writer mentions that there are no prices on the menu, the reader might infer that the restaurant is a very fancy,

expensive one.

In summary, schemata are highly organized, generic knowledge structures composed of "slots" or "placeholders" for each component, including information about constraints on what can fill the slot and the relationships among the slots. Schemata are hierarchically organized, from the most general, important pieces of information to more specific, less important pieces.

As part of the process of comprehension, a reader fills in the slots in the schema with information from the text and, for slots not explicitly mentioned in the text, with default values or values inferred from other slots. This process is referred to as instantiation of the schema. It is necessary for comprehension, since the writer does not specify every piece of information necessary for comprehension of a text.

The Application of Schema Theory to Reading

One area in which schema theory has stimulated a great deal of interest is in the area of reading comprehension. First, I will discuss the traditional views of reading, which conceptualize reading as a primarily unidirectional process, and then more recent concepts, which conceive of reading as an interactive process between the text and the reader, including evidence of interaction between the text and the reader's knowledge on various levels.

Inadequacies of Traditional Concepts of Reading

Models of reading (e.g., Gough, 1972; LaBerge and Samuels, 1974) have been proposed which conceptualize reading as being a unidirectional process from the printed page into the mind of the reader. These models propose, basically, that reading is a process of building symbols into words, words into sentences, and sentences into overall meaning. These models reflect traditional attitudes toward reading. This conceptualization is sometimes referred to as a *bottom-up process*, because the reader begins with the lowest level, features of symbols,

from which the symbols are identified. Strings of symbols are then analyzed into morphological clusters, from which words are recognized, and then strings of words are analyzed into phrases and sentences. The reader thus works up from marks on a page through words and sentences to meaning (Thomas, 1980).

However, many studies of the reading process have produced results that would be impossible to explain in terms of such a unidirectional model. On the symbol level, there are a number of studies that have indicated that identification of letters is influenced by their semantic or syntactic context. For example, Nash-Weber (1975) showed that an ambiguous symbol (which, in isolation, could be identified as either "w" or "ev") would be identified according to the context of the sentence. Also, Reicher (1969) found that a letter is perceived more accurately when it is part of a word than when it is pa.t of a string of unrelated letters. Even orthographic knowledge plays a role in letter identification. In a study reported by Rumelhart (1982), participants were presented with strings of letters, some of which had clusters of letters that were legal in English and some of which had illegal clusters. When asked to name the letters in the string, participants showed a tendency to transpose illegal clusters to make them legal, though they rarely transposed legal clusters to make them illegal. These studies and others indicate that identification of letters depends on higher level knowledge.

Further, perception of words is facilitated by their syntactic and semantic environments. Kolers (1970) analyzed substitution errors (errors in which an incorrect word is substituted for a correct one) made by adults in reading aloud. If the reading comprehension process were unidirectional, it would be expected that errors would be strongly influenced by visual similarity to the correct word. However, Kolers found that, in 70% of the cases, the substitution errors were the same part of speech as the correct word. (Eighteen percent would be expected by chance.)

In similar studies, Weber (1970) found that, in 90% of the cases, first graders' reading errors fit grammatically with the text up to that point,

and Stevens and Rumelhart (1975) found that 98% of the substitution errors recognizable as words were grammatically correct in the sentence. Also, Meyer and Schvaneveldt (1971) found that participants identifying pairs of words could identify the second word faster if it was semantically related to the first word, (e.g., "nurse" was easier to identify if it followed "doctor" than if it followed "bread"). The results indicate that word recognition is facilitated by higher level knowledge.

Lastly, sentence comprehension is facilitated by knowledge of semantics and context. Schank (1973) found that ambiguous sentences tended to be interpreted based on the reader's semantic knowledge (e.g., "I saw the Grand Canyon flying to New York" was interpreted as "I saw the Grand Canyon *while I was* flying to New York" rather than "I saw the Grand Canyon *which was* flying to New York."). Words with multiple meanings are interpreted in terms of the context in which they appear (Rumelhart, 1982). Bransford and Johnson (1973) found that a sentence was much more likely to be remembered if it was meaningful in context than if it was meaningless. These findings indicate that context is used in interpreting sentence meaning, and a sentence that does not fit the context may be difficult or impossible to understand, even if it is syntactically and semantically correct.

In summary, all of these studies show that lower level processes — the identification of words and letters — are influenced by intermediate and higher level processes — sentence comprehension and knowledge about the context. A conceptualization of reading must take into account these indications that the reading process makes use of top-down processing. As Thomas (1980: 34) stated, "What readers gain from a text, then, is only part of comprehension. Readers also integrate this information with the existing knowledge in their heads."

Interactive Processing in Reading

Goodman (1967, 1970) was among the first to spark the recent interest in reading as an interaction among levels of processing, rather than a bottom-up process. In this conceptualization of reading, the process is

viewed as one in which the reader makes use of higher-level knowledge in order to comprehend lower-level structures. Goodman characterized reading as a "psycholinguistic guessing game" in which the reader makes predictions and then samples input to confirm or disconfirm the predictions.

> The reader is not confined to information he receives from a half inch of print in clear focus.... The reader uses syntactic and semantic information as well. He predicts and anticipates on the basis of this information, sampling from the print just enough to confirm his guess of what's coming, to cue more semantic and syntactic information. Redundancy and sequential constraints in language, which the reader reacts to, make this prediction possible (Goodman, 1970: 131).

Goodman did not deal with schema theory directly. However, according to him, what happens "behind the eye" is as important as what is on the printed page. Goodman focused on how the reader's syntactic and semantic knowledge assists in the process of reading comprehension. More recently, researchers have expanded this focus to include ways that comprehension is assisted by both background knowledge and knowledge of discourse constraints.

Smith (1982) has been another strong and influential proponent of an interactional conceptualization of reading. Though, like Goodman, he did not deal directly with schema theory, he emphasized the role of what he referred to as *non-visual information*. Non-visual information is information that does not come from the printed page, including background knowledge and linguistic knowledge. Smith characterized the role of non-visual information as reducing alternatives in reading. This allows the readers to make predictions about what will be coming next, based on orthographic, syntactic, semantic, and background information.

> What we have in our heads is a theory of what the world is like, a theory that is the basis of all our perceptions and understanding of

> the world.... If we can make sense of the world at all, it is by interpreting our interactions with the world in the light of our theory.... Anything that I cannot relate to the theory of the world in my head will not make sense to me.... The system of knowledge that is the theory of the world in our heads has a structure just like any other theory or system of organizing information. Information systems have three basic components — a set of categories, some rules for specifying membership of the categories, and a network of interrelations among categories (Smith, 1982: 54-57).

Smith emphasized the value of using this theory of the world in prediction while reading.

> An important difference between a skilled driver and a learner is that the skilled driver is able to project the car into the future while the learner's mind is more closely anchored to where the car is now — when it is usually too late to avoid accidents. The same difference tends to distinguish skilled readers from beginners, or from anyone having difficulty with a particular piece of reading. In fluent reading the eye is always ahead of the brain's decisions, checking for possible obstacles to a particular understanding. Readers concerned with the word directly in front of their nose will have trouble predicting — and they will have trouble comprehending (Smith, 1982: 61).

Smith asserted that the predictions that readers make on various levels help them avoid being overloaded by information from the printed page. Without some expectation for what was coming, a reader would be overwhelmed with new information.

A considerable amount of research has been done over the past decade on how reading comprehension is influenced by content schemata. A number of studies have been done on native English speakers showing that readers demonstrate significantly better comprehension of texts for which they have greater background knowledge (e.g., Spiro, 1980; Taylor, 1979; Langer and Nicolich, 1981; Langer, 1984; Kintsch and Greene, 1978; Hare, 1982), or which fit schema that they

have (e.g., den Uyl and van Oostendorp, 1980; Haberlandt, Berian, and Sandson, 1980; Anderson, Spiro, and Anderson, 1978). Bransford and Johnson (1972) found that, when readers had no schema for a text, they recalled it significantly less well than if they did. Kozminsky (1977) showed that, when the title of a text caused the reader to activate one particular schema rather than another, readers tended to comprehend the text from the perspective of the schema suggested in the title.

Eamon (1978-1979) did a study on differences between the ways that good and poor readers use schemata. She found that good readers were able to recall more directly relevant information than information of less relevance. In contrast, for poor readers, there was less difference between memory for relevant and irrelevant material. This indicates that good readers use schemata, particularly the hierarchical characteristics of schemata, better than poor readers do.

All of these studies demonstrate the importance that content schemata have in reading comprehension.

Content Schema and Second Language Readers

As with first language readers, the traditional emphasis has been on the language to be comprehended and not on the person doing the comprehending.

> In these essentially 'linguistic' views of comprehension each word, each well-formed sentence, and every well-formed text 'has' a meaning. Meaning is conceived to be 'in' the text, to have a separate, independent existence from the reader. Failures to comprehend a nondefective text are viewed as being due to language-specific deficits — perhaps a word was not in the reader's vocabulary, a rule of grammar was misapplied, an anaphoric cohesive tie was improperly coordinated, and so on (Carrell, 1984: 332).

The recent interest in reading and schema theory among first language reading specialists has attracted the attention of second language

reading teachers and researchers. Second language reading theorists are coming to recognize that what the reader knows is as important as what is on the page.

Research on Second Language Learners

A number of studies have been done with second language learners in relation to reading and schema theory, using both content and textual schemata. The results of these studies are sometimes difficult to compare because of the differences in participants, sets of variables, and techniques used. Also, none of these studies have been replicated. However, they can hopefully shed some light on how or whether second language learners make use of schemata in reading. In this section, I would like to discuss the studies and the implications they have about second language readers' use of schemata.

A study by Steffensen, Joag-Dev, and Anderson (1979) did not use language specifically as a variable, since the participants were American native English speakers and Indians (natives of India) whose English proficiency was very high. However, the study did address the issue of cultural differences in background knowledge and how this knowledge assists or interferes with comprehension.

The researchers had American and Indian participants read descriptions of weddings from their own culture and from the other culture and then write descriptions of the weddings. Members of both groups read the description from the other culture more slowly than the one from their own. They not only remembered more details of the wedding in their own culture and remembered them more accurately, they were able to draw correct inferences from the description of the wedding in their own culture. This would tend to indicate that the readers were making use of a schema that is specific to their culture for weddings in storing the text in memory and in interpreting the meaning of the text.

Participants also often drew incorrect inferences from the description of the wedding from the other culture, based on the schema for weddings in their own culture. For example, the description of the Ameri-

can wedding included a mention that the bride wore her grandmother's wedding gown. An Indian participant reported, in the recall protocol, that the dress was, unfortunately, old and out of fashion, a comment which would fit the Indian view that it is important for the bride's family to show their economic status by providing a new, fashionable wedding sari for the bride to wear. American readers, in contrast, emphasized the aspect of family tradition involved in the bride wearing her grandmother's dress, which fits with the schema for American weddings. Apparently when readers do not have an appropriate schema (as the Indian readers did not have a schema for American weddings) they interpret input according to the most similar schema that they do have (i.e., the schema for Indian weddings).

In addition, recall protocols were often vague in areas where readers did not have schemata. For example, the text on the Indian wedding contained details about the gifts exchanged by the families. Indian respondents not only tended to remember what the gifts were, they commented on the significance of the gifts. In contrast, descriptions of the gifts by Americans were vague and did not include any information about the significance of the gifts.

This study is an indication that, even in the native language or a strong second language, the reader's knowledge of the schematic background of a text greatly aids comprehension. In addition, lack of an appropriate schema for a text hampers accurate comprehension. It is likely to be an even more serious problem for readers of a second language who have less-than-adequate language proficiency.

One problem with this study is that the researchers did not measure the prior knowledge that the participants had about weddings in the other culture. While most Americans probably do not know much about Indian wedding customs, Indians living in the US may have had the opportunity to attend an American wedding or may have learned about them from other sources. Participants who knew about wedding customs from the other culture may have produced more accurate recall protocols than those who did not.

This issue raises an important question in the intercultural study of schemata and comprehension. It is not clear whether the process of comprehending is different when making use of schemata from one's own culture than when making use of schemata learned from another culture. The question is complicated by the fact that schemata can overlap between cultures. Members of one culture do not necessarily share all of the same schemata. By the same token, members of different cultures can share the same schemata. For example, medical professionals in different cultures may share medical content schemata with each other that they do not share with other members of their own cultures.

Though some second language reading teachers have long recognized that their students were better able to deal with culturally familiar material (Carrell, 1983c), it was not until the 1980's that this was empirically tested. Studies of second language readers' ability to comprehend a text have traditionally focused on such factors as lexical difficulty and sentence length and complexity. However, when Johnson (1981) investigated the effects of text complexity and cultural background on comprehension, she found that, for second language readers, cultural background had a greater effect on ability to understand the text than did semantic and syntactic complexity.

Johnson had American participants and intermediate and advanced Iranian participants read simplified or unsimplified versions of two passages, one based on American folklore and one on Iranian folklore. For Iranians, she found an interaction between cultural background and language complexity for the total number of events recalled. More events were recalled from the simplified American story than from the unsimplified one, though there was no difference for the Iranian story. However, she did not find an interaction between language complexity and cultural background or a main effect for language complexity when she measured inferences made from the texts. Iranian participants produced more inferences from the culturally familiar story than from the unfamiliar one, regardless of language complexity.

Americans remembered more propositions from the American story, and more from the unsimplified stories, raising the possibility that the structure of adapted texts is somehow different from the text structure that native speakers are accustomed to. Like the Iranians, Americans produced more inferences from the culturally familiar story than the unfamiliar one.

The content schema variable may have been confounded in this study by a textual schema variable. Possibly knowledge of the textual schemata, the conventionalized arrangement of the events and themes in a story, had something to do with the fact that readers understood the folktale from their own culture better.

The results of this study indicate that Iranian second language readers do make use of schemata, whether content schemata or textual schemata, at least in reading narratives. Also, content or textual schemata seem to be more important than language complexity in making inferences from the text, though simplified language seems to be helpful in comprehending the events in the story.

Carrell (1983b) looked at the effects of three components of background knowledge: prior knowledge (familiar vs. novel), prior cues to the content of the text (context vs. no context) and the degree to which lexical items reveal the content area (transparent vs. opaque). Her participants, who were native speakers of English and high-intermediate and advanced nonnative speakers, included students from a variety of countries, but they were primarily Malaysians. In a 2 x 2 x 2 design, Carrell used the variables of context (providing or not providing and title and picture), transparency (presence or absence of vocabulary that provided cues to the content area) and familiarity (presence or absence of prior knowledge about the content). For the advanced group of students, familiarity was the only significant variable. More was recalled from the novel text than the familiar text. For the high-intermediate students, significantly more was recalled from the transparent version than the opaque version. All three variables affected the recall of native speakers.

Carrell concluded that native speakers make use of contextual cues to do top-down processing and lexical cues to do bottom-up processing, and that, at least in short term memory, novel information is more memorable. The nonnative speakers in Carrell's study, on the other hand, were not efficient about making use of context or textual cues. They were not particularly proficient at either top-down or bottom-up processing. If this study has any external validity at all, it raises the question of how the advanced students, who were attending regular university classes, were managing the reading required in those classes.

One flaw in this study is operationalization of the familiar/novel variable. As a familiar text, Carrell used a description of the procedure for washing clothes. The largest number of participants in this study were Malaysians. However, according to a Malaysian informant, some of the steps in the procedure as it is described in the text would not have been familiar to Malaysians. For example, the writer of the text mentioned the possibility of going somewhere outside of the home to wash clothes. Malaysians do not use laundromats in Malaysia. Also, the writer mentioned dividing clothing into different groups according to color. This is another thing that Malaysians do not do, except in fairly rare cases of clothing whose colors might run (personal communication, A. Ibrahim, June 1, 1987). Therefore, the supposedly familiar text may have been at least partly novel. This may be a case where the nonnative readers were using an event schema that was different in content than the one that the writer intended, rather than one where they are not able to activate a schema that they already had.

This points up a problem in doing schema research with nonnative speakers. When measurement indicates that second language readers have not made use of schemata, the question arises of whether the problem is that they do not have the necessary schema, that they have not activated the schema that they have, or that they have activated an inappropriate schema. This will be discussed in detail in the following section.

Another weakness of the study was that there was no manipulation

check on the prior knowledge manipulation. It is possible that some of the participants did not understand the significance of the picture that was presented to them, so that participants in the prior knowledge condition may not have had prior knowledge.

Hudson (1982) looked at the effects of different prereading exercises intended to activate schemata on the reading performance of beginning, intermediate and advanced students, primarily Iranians. In one condition, students were shown pictures related to the text, which they discussed. Afterwards, students privately generated predictions about the content of the text. In the second condition, students were given a list of vocabulary words and definitions. Both of these groups answered questions about the content of the text. In the third condition, students read the text, answered questions about it, read the text again, and answered the same questions again. Scores were significantly higher for the first condition for beginning and intermediate students. There was no difference for advanced students. Hudson interpreted this to indicate that advanced readers were able to activate schemata without outside help, but at the lower levels, some help in activating schemata was necessary.

While this study does indicate that prereading exercises are of some use to beginning and intermediate students, it is not clear from the study what aspects of the prereading exercise were effective in activating the schema. In the first condition, participants saw pictures related to the story, they discussed what was in the pictures, and they generated predictions. This raises a number of questions about the necessary and sufficient conditions for activating schemata using prereading exercises. Was it one of these three steps that activated the schema, or an interaction of the three? Would, for example, studying the pictures without discussing them have produced the same results? Was generating predictions a necessary part of the process? Would generating predictions have been sufficient alone? Further research to clarify the answers to these questions would be useful.

Also, since there was no control group that did not receive any

treatment, we do not know how the treatments Hudson used compared with no treatment at all, though the assumption probably would be that groups with no treatment would not have done as well as students in the first condition. If that assumption is correct, this study indicates that it is inadvisable to let students at the intermediate level or below read a text without preparation.

Use of Lexical Knowledge. Several studies have been done on the degree to which readers depend on the lexicon as they read. Cziko (1980) analyzed errors made in oral reading by intermediate and advanced readers of French as a second language and by native French speakers. He found that intermediate readers made errors that indicated greater reliance on graphic information than on contextual information, indicating a bottom-up strategy dependent on lexicon. Advanced readers, on the other hand, depended more on context, though not as much as native speakers did.

Ulijn (1981, 1984), using native Dutch speaking readers of French as a second language, found that more misunderstandings were caused by problems with vocabulary than by problems with syntax. This may indicate that readers are more dependent on their knowledge of vocabulary than on their knowledge of syntax.

Yorio (1971) did a survey of native Spanish speakers studying English as a second language and found that they felt that their lack of vocabulary was their greatest handicap. Lack of knowledge of grammar was considered a considerably less serious problem.

These studies indicate a pattern of dependence on vocabulary by second language readers. What this seems to indicate is that readers depend on bottom-up processing in reading in their second language. While Cziko (1980) and Ulijn (1981, 1984) did not appeal to schema theory in their explanation, it does seem to fit with the results that they found. Second language readers appear to identify content words and make use of schemata to identify relationships among those words.

Implications of Research

Based on these studies, it appears that concern about linguistic difficulty of texts is at least partially misplaced. In addition to lack of adequate linguistic proficiency, lack of appropriate schemata related to a text, or inability to make use of the schemata, can be sources of serious problems in comprehension. Second language readers seem to make some use of the schemata that they have in second languages, though they seem to do so less well than native speakers do. At intermediate levels of reading proficiency, readers seem to be using a bottom-up strategy of processing, in which they identify content words and use schemata to determine how the words should be related.

Hudson (1982) found that a prereading technique involving looking at pictures, discussing the pictures, and privately predicting what a text will be about seems to be useful in activating schemata for nonnative speakers. However, due to confounding of the variables in this study, it is not possible to determine which of the three steps, or combination of steps, in the prereading activity produced the effect.

Much more research is needed in the area of second language reading and schema theory and how these apply to the classroom before definitive conclusions can be reached in this area.

Hypotheses and Research Questions

Based on the results of previous studies with native and nonnative speakers, I propose the following hypotheses for this study:

H_1: A positive correlation will exist between background knowledge and reading comprehension, when lexical proficiency and reading proficiency are held constant.

For the purposes of this study, *reading comprehension* refers to understanding the meaning of a specific reading passage, while *reading proficiency* refers to general reading skill. Studies with native speakers have demonstrated the correlation between background knowledge and

reading comprehension fairly clearly. While the results of studies with nonnative speakers have been mixed, there is some indication that background knowledge improves reading comprehension.

H_2: Readers with high background knowledge will have a lower correlation between reading comprehension and reading proficiency than readers with low background knowledge.

This hypothesis is based on the previous hypothesis. If prior knowledge improves comprehension, it follows that there will be a lower correlation between reading proficiency and reading comprehension for readers with high prior knowledge than for readers with low prior knowledge. The comprehension of readers with high prior knowledge is improved by their prior knowledge. Readers with low prior knowledge, on the other hand, depend more on their reading proficiency, therefore their reading comprehension depends more on their level of reading proficiency.

In addition, I will be looking at the following research questions:

R_1: What are the relationships among prior knowledge, reading comprehension and lexical proficiency?

Research (see citations in the "Interactive Processing in Reading" section) indicates that second language readers depend on lexical knowledge to a greater extent than they do on grammatical knowledge. Readers with high prior knowledge are able to make better use of their lexical knowledge, because they should know what relationships to expect among concepts in the reading. Therefore, it could be expected that readers with high prior knowledge would be able to make better use of their lexical knowledge than readers with low prior knowledge and would therefore have a higher correlation between lexical knowledge and comprehension than readers with low prior knowledge.

R_2: How does reading comprehension differ for reading passages that require different amounts of background knowledge?

Bransford and Johnson (1972) found that readers comprehended pas-

sages for which they had schemata better than passages for which they had no schemata. However, the passages used were not based on authentic passages and seemed somewhat contrived. Carrell's (1983b) replication of this study using second language learners had a possible problem in that the participants may not have had the schema for washing clothes that she assumed that they had. However, it seems logical that the greater amount of background knowledge a passage requires, the more difficult it would be for a reader with low background knowledge related to that passage (i.e., without a well developed schema) to comprehend and the easier it would be for a reader with high background knowledge to comprehend.

Measurement Issues

In reading and schema research with nonnative speakers, there are special issues related to measurement. These include: 1) how to measure background knowledge, 2) how to measure comprehension of the text, and 3) how to determine whether a schema has been activated. Another measurement problem, though one not limited to research with nonnative speakers, is how to measure the amount of background knowledge necessary to comprehend a passage. In this section, I would like to look at how research done on both native speakers and nonnative speakers applies to this issue. While it is necessary to be cautious in such applications, results from research with native speakers can at least give some indication of possible solutions for the problems peculiar to nonnative speakers. I will also make some suggestions about methodological standards for research done in the area of reading and schema theory with nonnative speakers.

Measuring background knowledge and text comprehension are issues that researchers who use native speakers have dealt with. However, for the most part, studies with nonnative speakers have used participants where the background knowledge of the participants could be assumed to be either high or low. While this strategy avoids problems inherent

in measuring the prior knowledge of nonnative speakers, it may allow for rival hypotheses (e.g., Carrell, 1983b), since the assumptions about participants' background knowledge might be wrong. Being able to measure background knowledge would help eliminate rival interpretations in such studies. In addition to allowing mistaken assumptions about levels of background knowledge, manipulating background knowledge by using different texts may result in confounding variables, such as the difficulty level of the text.

Studies using a second language, especially at beginning or intermediate levels of proficiency, present problems not faced in studies using the participants' native language. It goes without saying that in measuring background knowledge or comprehension of a text, it is necessary that the method avoid confounding the variables involved. Nonnative speakers present special problems in this area. For example, if a method of measurement requires writing skill or reading skill on the part of the participant, participants of low proficiency may appear less knowledgeable than they actually are or may appear to comprehend the text less well than they actually do.

Methods of Assessing Background Knowledge. Since language ability is likely to be an issue, one possibility would be to test participants' background knowledge in their native language. While this would eliminate the possibility of participants' second language proficiency interfering with their ability to express what they know, there are likely to be practical problems. If all participants are from the same native language background, and if help is available for writing material and for coding responses in that language, this is a possibility. However, there are often not enough participants available from one language background, so participants from several language backgrounds are used. This makes it impractical to test participants' background knowledge in their native language. In such cases, or if, for some other reason, the researcher chooses not to measure background knowledge in the participants' native language(s), a method of measurement must be chosen that minimizes confounding of the measurement of

background knowledge with level of reading or writing proficiency.

Taylor (1979) and Stevens (1980) used multiple choice questions to assess background knowledge of participants. Spilich, Besonder, Chiesi, and Voss (1979) used completion items. These both are possibilities for testing the background knowledge of nonnative speakers. They share the advantages of being both easy to respond to and simple to score. However, one problem is that good multiple choice and completion questions are difficult to write. Multiple choice questions require carefully written alternatives so that the correct response is clearly correct but that distracters sound plausible. The stems of completion items must be written so that the expected answer is clear. A valid, reliable instrument also requires extensive pretesting (Heaton, 1975).

Another problem is that unless the researchers are very careful to make sure that the language is within the reading ability of the participants, the issue of whether reading ability influenced the results is likely to arise. For completion items, responses must not require active vocabulary beyond participants' proficiency. If there is a high correlation between the measure of background knowledge and of comprehension of the text, this might be attributed to the possibility that both measures are measuring reading ability.

The free association method of assessing background knowledge was originally developed by Langer (1980, 1981) as part of a prereading activity called the Pre-Reading Plan (PReP). Langer and Nicolich (1981), Langer (1984), and Hare (1982) further developed the procedure as a measure of prior knowledge. In this procedure, the participants are given three key content words or phrases related to a topic and asked to write anything that comes to mind when they hear each word or phrase. Responses are categorized by coders into three categories according to the amount of prior knowledge that they indicate — much (3 points), some (2 points) or little (1 point), with specific criteria for each category. (Langer originally used twelve levels of prior knowledge but found that these could be collapsed into three categories.) Scores were averaged for the three words or phrases. Langer and Nicolich

(1981) reported intercoder reliability of .82. They found that these measures of prior knowledge were highly correlated with comprehension of the text and had no significant relationship with measures of IQ. Hare (1982) used the same procedure and found similar results. Hare reported an interrater reliability of .90.

While this procedure has some drawbacks for measuring the background knowledge of nonnative speakers, it also has some advantages. A major advantage of this method is that it requires very little reading. As long as care is taken to choose key concept words that the participants will know, reading ability should not influence the results. (If this is a concern, key concept words might be translated into the native language(s) of respondents.) Another advantage is fairly high intercoder reliability, which might be difficult to achieve in methods that require more writing.

This method of measuring background knowledge is more cumbersome to score than multiple choice or completion items. The main drawback is that it does require writing. However, the writing requirements can be fairly minimal, with only a few phrases or sentences for each key concept word. If coders can judge the quality of the responses of nonnative speakers, independent of their writing ability, this problem may be at least partially overcome. The most serious problem would still be likely to be with beginning readers, who may not be able to express their knowledge of the concepts at all, resulting in lower ratings than they should receive.

While Langer's free association method has not, to my knowledge, been used as a measure of background knowledge with nonnative speakers, I think it is a promising measure, at least for participants with an intermediate to advanced level of proficiency in the target language.

Assessing Reading Comprehension. Methods of assessing reading comprehension have the same problems as measures of background knowledge. Stevens (1980, 1982) and Langer (1984) used multiple choice questions, and these have the same advantages and disadvantages mentioned above. Hare (1982) used short answer questions. For non-

native speakers, these would have the disadvantage of requiring writing and of being more difficult to score than multiple choice or completion items.

Nunan (1985) used a cloze procedure to test comprehension. He does not go into detail about choice of words for deletion. Obviously, the choice of words for deletion would be very important. An advantage of using the cloze procedure is that comprehension of different types of things could be checked by deleting different types of words. For example, cohesive ties could be deleted to test comprehension of cohesive relationships. A disadvantage, however, is that it would be difficult, though probably not impossible, to test participants' inferences from a text using the cloze method. Since drawing inferences seems to be a particular problem in material from another culture, it is important that the method of assessing comprehension be able to assess ability to draw inferences from a text.

A more customary way of assessing comprehension in schema theory research is through recall protocols (e.g., Fass and Schumacher, 1981; Spilich, Besonder, Chiesi, and Voss, 1979; Kintsch and Greene, 1978). For high intermediate and advanced participants, this is probably not a problem, as long as coders are not influenced by writing ability in their judgments about comprehension. For participants with lower proficiency, this is more of a problem, since they may be entirely unable to express some of the concepts that they actually did understand.

Assessing Schema Activation. In doing research related to reading and schema theory with nonnative speakers, questions of whether a schema was activated, or which schema has been activated, may be raised. Results of studies using native speakers provide some information about how schemata operate when they are activated. Some of these studies may be useful in developing measures of whether schemata have been activated.

Studies by Pichert and Anderson (1977) and Anderson and Pichert (1978), and Fass and Schumacher (1981) suggest a technique that might be useful in answering this question. They had participants read a story

in which a house was described. Half of the participants were asked to read the story as if they were potential homebuyers; the other half were asked to read it as if they were burglars planning on breaking into the house. When asked to recall the passage, participants recalled more pieces of information that were important from the perspective that they had been told to use in encoding the passage (e.g., for the homebuyer, that the basement was damp and musty and the house needed a new roof; for the burglar, that the house was not visible from other houses and that a side door was left unlocked during the day).

Similarly, Kozminsky (1977) had participants read passages with different titles. Participants tended to recall more propositions from the point of view suggested by the biasing title.

The results of these studies might be applied to the question of whether a schema had been activated by nonnative speakers using a similar method. Participants could be instructed to encode a passage from one perspective or another. Readers who recalled significantly more propositions related to the perspective they had been assigned would be considered to have activated that schema. If there was no difference in the number of propositions for the two perspectives, the schema was not activated. Researchers might even be able to analyze the propositions that were produced to see if they did match a particular schema. While it might be difficult to identify this schema with certainty, this analysis might at least point the researchers in certain directions. Since this method of research has never been applied to nonnative speakers, research is necessary to see how nonnative speakers do perform in these circumstances.

Findings of Bransford and Johnson (1972, 1973) suggest another possible technique. Bransford and Johnson (1972) did a series of studies in which they presented participants with a paragraph. A disambiguating context (in the form of a picture) given before reading, after reading or not at all. Participants who did not have a context or who were given the context after reading the passage remembered the passage less well than those who were given the context before reading

the passage. Participants who were not given a context from the beginning reported that, as they read, they did attempt to search for some schema that would make the paragraph meaningful.

Bransford and Johnson (1973) presented participants with identical paragraphs with two different titles. One sentence in the paragraph was meaningless from the perspective suggested by one of the titles but meaningful from the other context. This sentence was found significantly more frequently in the recall protocols of participants with a meaningful context than in the protocols of the participants that did not have a meaningful context.

Background Knowledge Required to Understand a Passage. A measurement problem for researchers with both native and nonnative speakers is how to objectively measure the amount of background knowledge necessary to comprehend a passage. While there are various ways to measure the difficulty of reading passages that take into account such factors as grammatical complexity, sentence length, and lexical difficulty, there does not appear to be an established method for measuring the amount of background knowledge necessary to comprehend a passage.

One possibility would be to ask readers familiar with the topic of a passage to list the pieces of background information that they felt would be necessary for full comprehension. While this might not provide an absolute measure, it should demonstrate the relative differences between passages.

Another possibility is to ask proficient readers with little background knowledge to rate passages according to their difficulty. Again, this would not provide an absolute standard, but it would indicate the relative contribution of background knowledge to comprehension.

Methodological Standards

Because of the complex issues related to measurement in research in the area of schema theory and reading with nonnative speakers, it

becomes important to set methodological standards for this research. In this section, I would like to propose some standards suggested by the considerations discussed in the previous sections.

Measuring Background Knowledge. The first criterion is that researchers should measure background knowledge, or determine it by some other method, rather than assume the background knowledge of participants from other cultures.

In the case of research with native speakers, especially related to event schemata, background knowledge is sometimes assumed (e.g., Bransford and Johnson, 1972; Taylor, 1979). In studies using event schemata with members of one culture or subculture, this may be justified, since event schemata seem to be highly conventionalized within a culture (Bower, Black, and Turner, 1979). However, assumptions about content schemata are more difficult to make when using participants from different cultures (or even subcultures of one culture). Therefore, it is important for researchers to get information about the schemata of the members of other cultures.

This may be done in a variety of ways, for example, by using questions, by using Langer's free association technique, by asking participants to list the steps in an event schemata (as Bower, Black and Taylor [1979] did), or by use of informants from that culture. (In the latter case, researchers must be careful to use informants from the same ethnic and social group as the participants for the research, since schemata might differ among different groups.) Researchers should also be cautious about combining participants from different cultures together, since their schemata may differ. (This may be a practical problem for researchers in English-speaking countries, since it is often difficult to find a sufficient number of participants from the same country.) Also, if the researcher manipulates background knowledge, as Carrell (1983b) did, there should be manipulation checks.

Measurement Instruments. The second criterion is that instruments used to measure schemata and reading comprehension should take into account the language proficiency of the participants.

As with any other measures used in research, measurement instruments used in reading and schema theory research with nonnative speakers should be reliable and valid. For nonnative speakers, the language proficiency of the participants is of particular concern in assuring that measures are reliable and valid. It goes without saying that measures should be pretested to help insure this. For example, a researcher using multiple choice questions must be concerned about the reading proficiency required to answer the questions, while one using recall protocols must be concerned about writing proficiency, both in terms of the participants' ability to express themselves and the coders' ability to judge content apart from grammatical errors.

Measuring Activation of Schemata. The third criterion is that researchers should consider instruments that include some measure of whether the appropriate schema has been activated.

In the previous section, two methods were suggested by which activation of schemata could be measured. Since there is still some question about the degree to which nonnative readers make use of schemata, researchers might include measures of whether readers have activated a schema. (In addition, more research is necessary on the measures of schema activation.) This would hopefully lead to a greater understanding of how nonnative speakers use schemata.

Prereading Activities. The fourth criterion is that researchers doing studies related to prereading activities in the classroom should avoid confounding the treatment conditions that they use.

While Hudson (1982) made an important contribution to understanding of the effect of prereading exercises, questions remain because it is not clear which of the elements of the prereading activity caused the effects that Hudson found. Researchers who do future studies in this area should operationalize the variables and should design prereading activities in a way that would allow them to determine which element(s) of the activity caused the results that were found.

Measurement of Language Proficiency. The fifth criterion is that researchers should measure the reading proficiency of participants and

use it as a variable.

Previous studies have shown differences in results for readers of different levels of proficiency (e.g., Carrell, 1983b; Ulijn, 1984; Hudson, 1982; Cziko, 1980). Future researchers should measure the reading proficiency of participants and use it as a variable in the analyses.

Measuring Required Background Knowledge. The last criterion is that researchers comparing two or more passages should take into account the relative amount of background knowledge necessary to comprehend the passage.

Again, more research is needed on this issue to identify methods of measurement and demonstrate their validity and reliability. However, the demonstrated importance of background knowledge to comprehension makes it necessary to differentiate the amount of background knowledge required by different passages.

Conclusions

Implications for the Second Language Classroom

Research on schema theory in general and its application to reading in a second language in particular has important implications for the second language classroom. Studies show that readings with an unfamiliar background, including an unfamiliar cultural background, are more difficult to understand. Understanding inferences and relationships among different pieces of information is a particular problem, for both native and nonnative speakers.

In second language reading classes, teachers and materials developers should consider findings related to reading and schema theory. (However, as Carrell [1986] pointed out, most of the research that has been done has been in the area of schema theory and second language learning has not been done in classroom settings, and that which has been done has not been applied to a variety of settings. Therefore, caution is necessary in applying conclusions to classroom teaching.)

The findings have implications in three major areas: 1) choice of materials, 2) helping students activate schemata, and 3) helping students deal with reading texts independently. I will discuss each of these briefly.

Choice of Materials. Johnson (1981) found that familiarity of the cultural background of a text had a greater influence on comprehension than did language complexity. While it is not appropriate to ignore language complexity entirely in choosing materials, this indicates that familiarity of the background of materials should be a major factor in decisions about choices of reading materials, especially at lower levels of language proficiency.

Helping Students Activate Schemata. Students may have some difficulty activating their schemata independently. Hudson (1982) found that students at the beginning and intermediate levels who experienced a prereading activity specifically intended to activate a schema did better than students who did other prereading activities. These results indicate that appropriate prereading activities are important, especially at the beginning and intermediate levels. However, more research is necessary to refine knowledge about what is necessary in such prereading activities and what other activities might be useful. Wilson (1987) has suggested a number of prereading activities, including having students work in groups to list the things they already know about a topic, making predictions about a reading, then confirming their predictions, and discussing the historical background of a text. Wilson's suggestions, along with others that have been made (e.g., Hudson, 1982; Langer, 1981), can form the basis for future research on prereading activities and schema activation.

Preparing Students to Read Independently. The previous section raises another issue — how well do techniques for activating schemata in a classroom setting transfer to independent reading? It is vital that the reading classroom prepare students for reading outside of the classroom. Can second language students be taught to do prereading preparation that will help them activate the schemata that they need to

use? To answer these questions, more research is needed, preferably over a period of time. Hudson's prereading technique might be modified so that students are taught to look at the title, subheadings, etc., from a text, think about what they know about the subject, and make predictions about what is likely to be included in the text. Carrell (1985) found that students could be taught to identify the textual schema for a text, and that this helped them comprehend the text better. Possibly a similar technique would work for content schemata.

CHAPTER 2

METHODOLOGY OF THE STUDY

Overview

In this study, I looked at how East Asian nonnative English speakers make use of schemata when they read English. In particular, I compared amount of prior knowledge, reading proficiency, and knowledge of vocabulary to reading comprehension.

Instrument

The instrument was pretested with twenty participants from Japan, China, Taiwan, and Korea. Eight passages were pretested, from which three (Kitao et al., 1983: 137; Lubin, 1983: 89; and Reichler, 1987: 93) were chosen. The passages chosen were those on which nonnative speakers showed a range of responses for number of pieces of information recalled and prior knowledge. These passages showed a high degree of variance in the amount of prior knowledge and recall demonstrated by participants and in the amount of prior knowledge required for comprehension.

The first section of the final measurement instrument consisted of nine phrases, all of them translated into the native languages of the participants. Respondents were asked to write down three things that they knew about each phrase, in order to demonstrate their knowledge about that topic. Next, participants read a passage. After reading the passage, respondents answered vocabulary items.

Participants were next asked to write down fifteen pieces of information that they remembered from the passage, provide a title for the passage, and state the main idea of the passage in one or two sentences. Asking participants to write down what they remembered from the

passage was intended to measure their comprehension of the details of the passage. Asking them to suggest a title and state the main idea was intended to measure their comprehension of the overall meaning of the passage. These measures were repeated for all three passages. (See appendix.) The order in which the passages was presented was counterbalanced.

Passages were used that required different amounts of background knowledge for comprehension. The amount of background knowledge required to comprehend a passage was measured by asking native English speakers with knowledge of the topic of the passage to list the pieces of background information, excluding lexical and grammatical knowledge, necessary for understanding that passage. (Before doing this the respondents were given an example.) The responses were evaluated by blind coders, who counted the number of pieces of information that were necessary for comprehending the passage. The number of pieces of information considered to be necessary was compared using t-tests.

In the third section, to measure reading proficiency, participants were given a passage with blanks in place of some words. They were asked to fill in the blanks with appropriate words from alternatives provided. In the last section of the measure, participants provided such demographic information as age, nationality, and length of time spent in English-speaking countries.

Participants

Participants were ninety-six natives of China, Japan, Korea, and Taiwan living in or visiting the United States, mostly students and housewives. (Participants from these countries were used because they learned English in their native countries using similar methods [grammar-translation method], they had little exposure to English in the native countries, and none of their native languages are related to English.) Fifty-three participants were regular Michigan State Univer-

sity students. Thirty-one were English Language Center students. The remainder were spouses of students or students in the Haslett Adult Basic Education program. Volunteers were solicited in language classes and contacted by phone through the membership lists of the Japanese, Taiwanese and Korean clubs, through lists of international students maintained by the dormitories, and through personal contacts from those countries.

Procedures

Participants were asked to come to a meeting room or classroom at specified times to fill out the measurement instrument. Before filling out the measurement instrument, participants were asked to sign a consent form. No instructions were given other than those included in the instrument, except to state the time limits for each section. However, participants were allowed to ask questions of the researcher if any of the instructions were unclear.

For the first section (prior knowledge), participants were allowed as much time as they needed to finish the section. However, they were encouraged to try to finish it within fifteen minutes. Participants were allowed three minutes for each reading passage and four minutes for each vocabulary section. Eight minutes were allowed for participants to write down what they recalled from the passage and answer questions about the title and main idea of the passage. If participants had not started on the last two questions after six to seven minutes, they were reminded of them. Participants were warned when one minute remained. No time limit was put on the reading proficiency test or questions on demographic information.

The time limits were based on pre-testing. A sufficient amount of time was allowed for most participants to comfortably finish each section.

Measurement

The amount of prior knowledge was rated by blind coders on a scale of zero to three, based on the system of coding developed by Langer (1984). A rating of three points was awarded for a response that indicated much prior knowledge (e.g., superordinate concepts, precise definitions, or detailed and accurate explanations). A rating of two points was given for a response that indicated some prior knowledge (e.g., examples or attributes of the concept). A rating of one point was given for responses that indicated little prior knowledge (e.g., first hand experiences or sound alikes). A rating of zero was given for irrelevant responses or no responses.

Participants' comprehension of each passage was measured in three ways. It was measured according to 1) blind coders' ratings of the quality of the title provided, 2) coders' ratings of the quality of the statement of the main idea of the passage, and 3) coders' count of the number of idea units from the passage included in participants' summaries of the passages.

The quality of the title and summary was rated on a scale from zero to three. A rating of three points was awarded for titles and summaries that expressed the main idea of the passage particularly well and insightfully (e.g., Scarlett O'Hara — Her Life and Character). A rating of two points was awarded to titles and summaries that included information from the passage but did not seem to express the intent of the passage as a whole (e.g., Baseball is very popular in the United States). A rating of one point was awarded for titles or summaries that covered only a small portion of the passage (e.g., Reconstruction Atlanta). For missing or irrelevant titles and summaries, no points were awarded.

Idea units were specified *a priori* from the reading passages (Carrell, 1983b). They were words or phrases that corresponded generally with subjects, objects, verb phrases, prepositional phrases, etc. Short idea

units were chosen in order to allow fine distinctions among the number of idea units recalled.

Participants were assigned scores for reading proficiency and vocabulary proficiency, based on the number of correct responses to the reading and vocabulary tests, respectively.

Analyses

The effect of order of presentation of the passages was checked, using analysis of variance with comprehension measures as dependent variables and order and reading proficiency as independent variables. Effects of nationality were checked using measures of reading comprehension as dependent variables and nationality and reading proficiency as independent variables. Differences between male and female respondents were checked, using reading comprehension measures as dependent variables and gender, vocabulary comprehension, and reading proficiency as independent variables. Intercoder reliability was evaluated for ratings of background knowledge and reading comprehension.

In order to test the hypotheses, partial correlations were calculated between measures of reading comprehension, controlling for length of time spent in English-speaking countries, reading proficiency and vocabulary proficiency (H_1). In order to get additional insight into the contribution of prior knowledge to comprehension, in relation to reading proficiency, two additional calculations were performed. A partial correlation was calculated for reading proficiency, controlling for prior knowledge, vocabulary proficiency, and length of time in English-speaking countries. Using a median split for reading proficiency, partial correlations were calculated between prior knowledge and comprehension, controlling for length of time in English-speaking countries, vocabulary proficiency, and reading proficiency.

Using a median split for background knowledge, correlations between measures of reading comprehension and reading proficiency were calculated and compared for participants with high and low background

knowledge (H_4). Using a median split for prior knowledge, correlations between vocabulary proficiency and reading comprehension were compared for readers with high and low proficiency (R_1).

CHAPTER 3

RESULTS OF THE STUDY

Initial Analyses

Intercoder Reliability

Correlation coefficients were calculated among six coders for each of the four types of coded responses (degree of prior knowledge, number of idea units, quality of title, and quality of statement of main idea). The mean correlation coefficients were .87 for prior knowledge, .92 for idea units, .88 for titles, and .91 for main ideas. These correlations were used to correct for attenuation due to measurement error.

Reliability of Measures

Chronbach's alpha for the lexical proficiency measure was .76. Chronbach's alpha for the reading proficiency measure was .67. These values were used to correct for attenuation due to measurement error.

Background Knowledge Required for Comprehension

In order to compare the amount of background knowledge required to comprehend the three passages, fifty-three native English speakers, familiar with one of the three topics, were given one of the passages and were asked to list the pieces of background knowledge necessary to comprehend the passages. Raters listed more pieces of background information as necessary to comprehend the *Gone with the Wind* passage than the wedding passage ($\bar{x}$ = 3.87 for *Gone with the Wind* passage; $\bar{x}$ = 1.53 for wedding passage; $t = 3.30$, $df = 30$, $p < .05$, $r = .52$). Significantly more pieces of information were listed for the *Gone with the Wind* passage than for the baseball passage ($\bar{x}$ = 3.87 for *Gone with the Wind* passage; $\bar{x}$ = 0.48 for baseball passage; $t = 5.88$, $df = 34$, $p < .05$, $r = .71$). A significant difference was also found between the number of

pieces of information listed for the wedding and the baseball passage ($\bar{x}$ = 1.53 for wedding passage; $\bar{x}$ = 0.48 for baseball passage; $t = 2.70$, $df = 36$, $p < .05$, $r = .41$).

Consistency Checks

Since the order in which the passages were presented to participants was counterbalanced, three 2 x 2 x 3 analyses of variance were calculated to determine whether the order of presentation affected responses. The order of presentation, reading proficiency, and prior knowledge (using median splits for the latter two variables) were used as independent variables; each of the three measures of comprehension was used as a dependent variable. No main effects and only one interaction effect were found. However, since there was only one interaction effect, and since the effect size was small, order was not treated as a variable, and all of the responses to each passage were combined, regardless of whether the passage was presented first, second, or third. It did not make a difference in the results of the measures of comprehension whether a particular passage was presented first, second, or third. Knowing in advance what the tasks (recalling pieces of information from the passage, suggesting a title, and stating the main idea) would be did not greatly help participants do better on those tasks.

In order to see whether the gender of the participant made a difference in the responses to the tasks, 2 x 2 x 2 ANOVAs were calculated, using each of the three measures of reading comprehension as the dependent variable and gender, reading proficiency, and prior knowledge as independent variables, with median splits for the latter two variables. No main effects and no interaction effects were found for gender. Therefore, gender was not considered as a variable and results from male and female participants were combined.

In order to determine whether the nationality of the participants made a difference in their responses, 2 x 2 x 4 ANOVAs were calculated for each passage, using each of the three measures of reading compre-

hension as a dependent variable and nationality, reading proficiency, and prior knowledge, with median splits for the latter two, as independent variables. No main effects were found for nationality, and no interaction effects were found involving nationality. Therefore, nationality was not treated as a variable, and responses from participants of different nationalities were combined.

Pearson Correlations

Pearson correlations were calculated among the variables of reading proficiency, lexical proficiency, length of time in English-speaking countries, prior knowledge, and the three measures of reading comprehension (number of idea units recalled and ratings of the title and summary of the main idea) for each reading passage. The results appear in Tables 1, 2, and 3.

	Title	Idea Units	Proficiency	Vocabulary	Prior Knowledge	Length
Main Idea	.49*	.30*	.27*	.37*	.37*	.30*
	(.54)*	(.33)*	(.34)*	(.47)*	(.42)*	(.32)*
Title		.22*	.18*	.18*	.29*	.20*
		(.24)*	(.22)*	(.22)*	(.33)*	(.21)*
Idea Units			.22*	.32*	.21*	.13
			(.28)*	(.38)*	(.24)*	(.14)
Proficiency				.48*	.10	.32*
				(.67)*	(.11)	(.39)*
Vocabulary					.05	.37*
					(.05)	(.43)*
Prior Knowledge						.04
						(.04)

Table 1 — Pearson correlations among variables (*Gone with the Wind* passage)

* = $p < .05$ ( ) = corrected for attenuation N = 96

	Title	Idea Units	Proficiency	Vocabulary	Prior Knowledge	Length
Main Idea	.34*	.37*	.10	.25*	.27*	.16
	(.38)*	(.41)*	(.13)	(.30)*	(.31)*	(.17)
Title		.00	-.17*	.03	.19*	-.04
		(.00)	(-.22)*	(.03)	(.22)*	(-.04)
Idea Units			.33*	.50*	.20*	.24*
			(.41)*	(.60)*	(.22)*	(.25)*
Proficiency				.48*	.05	.32*
				(.67)*	(.05)	(.39)*
Vocabulary					-.04	.37*
					(-.04)	(.43)*
Prior Knowledge						.10
						(.11)

Table 2 — Pearson correlations among variables (wedding passage)
* = $p < .05$ ( ) = corrected for attenuation N = 96

	Title	Idea Units	Proficiency	Vocabulary	Prior Knowledge	Length
Main Idea	.36*	.39*	.18*	.26*	.17	.09
	(.40)*	(.43)*	(.23)*	(.31)*	(.19)	(.09)
Title		.18*	.12	.12	.10	.02
		(.20)*	(.16)	(.15)	(.11)	(.02)
Idea Units			.24*	.19*	.21*	.11
			(.30)*	(.23)*	(.24)*	(.11)
Proficiency				.48*	.28*	.32*
				(.67)*	(.30)*	(.39)*
Vocabulary					.19*	.37*
					(.20)*	(.43)*
Prior Knowledge						.18*
						(.19)*

Table 3 — Pearson correlations among variables (baseball passage)
* = $p < .05$ ( ) = corrected for attenuation N = 96

For all three passages, significant correlations were found between prior knowledge and the number of idea units recalled. For the *Gone with the Wind* and wedding passages, there were significant correlations between prior knowledge and the statement of the main idea. The correlations among the main idea, title, and number of idea units were significant, except for the correlation between the title and the number of idea units for the wedding passage. Both lexical and reading proficiency were significantly correlated with the length of time participants had spent in English-speaking countries. Prior knowledge of baseball was significantly correlated with length of time in English-speaking countries, but prior knowledge of American weddings and *Gone with the Wind* was not.

Hypotheses

Hypothesis 1

Prior Knowledge and Comprehension. The first hypothesis stated that there would be a correlation between prior knowledge and reading comprehension. In order to test this hypothesis, partial correlations between prior knowledge and each of the three measures of reading comprehension were calculated. These partial correlations appear in Tables 4, 5, and 6. These are third order partials, controlling for reading proficiency, lexical proficiency, and length of time in English-speaking countries.

	Title	Main Idea	Idea Units
Prior	.28*	.37*	.20*
Knowledge	(.32)*	(.42)*	(.22)*

Table 4 — Third-order partial correlations, controlling for reading proficiency, lexical proficiency, and length of time in English-speaking countries (*Gone with the Wind* passage)

* = $p < .05$ ( ) = corrected for attenuation N = 96

	Title	Main Idea	Idea Units
Prior	.20*	.30*	.29*
Knowledge	(.23)*	(.34)*	(.33)*

Table 5 — Third-order partial correlations, controlling for reading proficiency, lexical proficiency, and length of time in English-speaking countries (wedding passage)

* = $p < .05$ ( ) = corrected for attenuation N = 96

	Title	Main Idea	Idea Units
Prior	.08	.13	.17
Knowledge	(.09)	(.15)	(.19)

Table 6 — Third-order partial correlations, controlling for reading proficiency, lexical proficiency, and length of time in English-speaking countries (baseball passage)

* = $p < .05$ ( ) = corrected for attenuation N = 96

For both the *Gone with the Wind* passage and the wedding passage, third order partial correlations between prior knowledge and all three measures of comprehension, controlling for reading proficiency, lexical proficiency, and length of time in English-speaking countries, were significant. However, none of these partial correlations were significant for the baseball passage. Apparently, the significant Pearson correlations were spurious for the baseball passage and can be attributed to the correlation that both have with reading and lexical proficiency. One possible explanation for the lack of significant correlations is that, since the baseball passage required little prior knowledge for comprehension, prior knowledge was of little assistance in comprehension, and, conversely, lack of prior knowledge was little impediment to comprehension.

These results support the hypothesis for passages requiring a degree of prior knowledge for comprehension. However, for the passage that requires the least background knowledge, the hypothesis is not supported.

Median Split for Prior Knowledge. In order to further assess the effect of prior knowledge for readers of different levels of proficiency, partial correlations between prior knowledge and reading comprehension were calculated using median splits for proficiency, controlling for reading proficiency, lexical proficiency, and length of time in English-speaking countries. The results appear in Tables 7, 8, and 9.

	Title	Main Idea	Idea Units
Prior Knowledge	.10 (.11)	.18 (.20)	.07 (.08)
(High Proficiency [N = 49])			
Prior Knowledge	.38* (.43)*	.51* (.58)*	.41* (.46)*
(Low Proficiency [N = 47])			

Table 7 — Third-order partial correlations, controlling for reading proficiency, lexical proficiency, and length of time in English-speaking countries, with median split according to prior knowledge (*Gone with the Wind* passage)

* = $p < .05$ ( ) = corrected for attenuation

For the *Gone with the Wind* passage, for participants with high proficiency, none of the correlations were significant. For participants with low proficiency, all of the correlations were significant. The difference between the correlation between prior knowledge and the main idea and for idea units were significant at the .05 level. As discussed above, the *Gone with the Wind* passage requires the most prior knowledge for comprehension. The results of these calculations indicate that readers with high proficiency are able to overcome, to some degree, their lack of prior knowledge. However, readers with low proficiency appear to depend on their prior knowledge to overcome deficits in their reading proficiency.

	Title	Main Idea	Idea Units
Prior	.17	.18	.31*
Knowledge	(.20)	(.20)	(.35)*
(High Proficiency [N = 49])			
Prior	.21	.48*	.22
Knowledge	(.24)	(.55)*	(.25)
(Low Proficiency [N = 47])			

Table 8 — Third-order partial correlations, controlling for reading proficiency, lexical proficiency, and length of time in English-speaking countries, with median split according to prior knowledge (wedding passage)
* = $p < .05$ ( ) = corrected for attenuation

For the wedding passage, the correlations between prior knowledge and idea units for participants with high proficiency and between prior knowledge and the main idea for participants with low proficiency were significant. The difference between correlations with the main idea was significant at the .05 level. The interpretation of these results is less clear than for the *Gone with the Wind* passage. The wedding passage required less prior knowledge than the *Gone with the Wind* passage. In this case, participants with higher proficiency were more able to make use of their prior knowledge on the idea units measure of comprehension than the participants with lower proficiency. However, in the case of the main idea, participants with lower reading proficiency were better able to make use of their prior knowledge.

For the baseball passage, none of the correlations were significant. None of the differences between correlations were significant. Of the three reading passages, this one required the least background knowledge. In this case, at least, participants were not helped by their prior knowledge in reading a passage where little prior knowledge was required for comprehension.

Another possible explanation is that the information in the baseball passage was so basic that it was within the range of knowledge of almost all of the participants, although the other two passages included information that was outside of the range of prior knowledge of some

	Title	Main Idea	Idea Units
Prior Knowledge	.13 (.15)	.04 (.05)	.17 (.19)
(High Proficiency [N = 49])			
Prior Knowledge	.02 (.02)	.18 (.20)	.10 (.11)
(Low Proficiency [N = 47])			

Table 9 — Third-order partial correlations, controlling for reading proficiency, lexical proficiency, and length of time in English-speaking countries, with median split according to prior knowledge (baseball passage)
* = $p < .05$ ( ) = corrected for attenuation

of the participants. In other words, the baseball passage may have included only "old" information for most of the participants, while, in contrast, the wedding and *Gone with the Wind* passages may have contained mostly new information for some participants, some new and some old information for some participants, and mostly old information for some participants. If so, it might be expected that prior knowledge would affect comprehension differentially in the latter case but not in the former case.

Proficiency and Comprehension. In order to see what contribution reading proficiency makes, in comparison to prior knowledge, partial correlations were calculated between proficiency and the three measures of reading comprehension. These controlled for prior knowledge, lexical proficiency, and length of time in English-speaking countries. The results appear in Tables 10, 11, and 12.

	Title	Main Idea	Idea Units
Proficiency	.06 (.06)	.06 (.06)	.06 (.06)

Table 10 — Third-order partial correlations, controlling for prior knowledge, lexical proficiency, and length of time in English-speaking countries (*Gone with the Wind* passage)
* = $p < .05$ ( ) = corrected for attenuation N = 96

	Title	Main Idea	Idea Units
Proficiency	-.19*	-.03	.08
	(-.20)*	(-.03)	(.08)

Table 11 — Third-order partial correlations, controlling for prior knowledge, lexical proficiency, and length of time in English-speaking countries (wedding passage)

* = $p < .05$ ( ) = corrected for attenuation N = 96

	Title	Main Idea	Idea Units
Proficiency	.06	.04	.09
	(.06)	(.04)	(.09)

Table 12 — Third-order partial correlations, controlling for prior knowledge, lexical proficiency, and length of time in English-speaking countries (baseball passage)

* = $p < .05$ ( ) = corrected for attenuation N = 96

Except for the negative correlation between proficiency and the title for the wedding passage, none of the partial correlations between proficiency and the measures of comprehension were significant. The partial correlation between the title and proficiency was negative. These results indicate that, for these passages, participants' reading proficiency is not related to their ability to comprehend the reading passages. This does not necessarily mean that reading proficiency is not a factor. Possibly the level of difficulty of these reading passages was within the range of reading proficiency of most of the participants. More difficult passages might have produced significant results for the correlations between reading proficiency and comprehension.

Hypothesis 2

Proficiency and Prior Knowledge. The second hypothesis stated that readers with higher prior knowledge would have lower correlations between reading comprehension and reading proficiency than readers with low prior knowledge. In order to test this hypothesis, a median

split was used to divide participants into high and low proficiency groups. Partial correlations were then calculated between proficiency and the measures of comprehension for each group, controlling for prior knowledge, lexical proficiency, and length of time in English-speaking countries. The results appear in Tables 13, 14, and 15.

	Title	Main Idea	Idea Units
Proficiency	.16	-.07	-.15
	(.17)	(-.07)	(-.16)
(High Prior Knowledge [N = 50])			
Proficiency	.02	.13	.13
	(.02)	(.14)	(.14)
(Low Prior Knowledge [N = 46])			

Table 13 — Third-order partial correlations, controlling for prior knowledge, lexical proficiency, and length of time in English-speaking countries, with median split according to prior knowledge (*Gone with the Wind* passage)
* = $p < .05$ ( ) = corrected for attenuation

For *Gone with the Wind*, none of the partial correlations between proficiency and the measures of reading comprehension were significant. Differences between the correlations were not significant.

	Title	Main Idea	Idea Units
Proficiency	-.35*	-.08	.06
	(-.37)*	(-.08)	(.06)
(High Prior Knowledge [N = 48])			
Proficiency	-.11	.02	.13
	(-.12)	(.02)	(.14)
(Low Prior Knowledge [N = 48])			

Table 14 — Third-order partial correlations, controlling for prior knowledge, lexical proficiency, and length of time in English-speaking countries, with median split according to prior knowledge (wedding passage)
* = $p < .05$ ( ) = corrected for attenuation

For the wedding passage, there was a significant negative correlation between proficiency and title for participants with high prior knowl-

edge. None of the other correlations were significant. There were no significant differences between correlations for readers with high and low knowledge.

	Title	Main Idea	Idea Units
Proficiency	-.09	-.19	.09
	(-.10)	(-.20)	(.09)
(High Prior Knowledge [N = 52])			
Proficiency	.24	.24	.02
	(.26)	(.25)	(.02)
(Low Prior Knowledge [N = 44])			

Table 15 — Third-order partial correlations, controlling for prior knowledge, lexical proficiency, and length of time in English-speaking countries, with median split according to prior knowledge (baseball passage)

* = $p < .05$ ( ) = corrected for attenuation

None of the partial correlations were significant for the baseball passage. The difference between the correlations between proficiency and the main idea was significant at the .05 level.

The hypothesis that participants with high prior knowledge would have a lower correlation between proficiency and comprehension than participants with low prior knowledge was only partially supported by the results of this study. Out of nine comparisons, two were significant and in the direction predicted. Of the remaining seven comparisons, five of the differences were in the direction predicted, but the differences were not significant. While these results do not unequivocally support the hypothesis, they do suggest that it is true.

One possible explanation for the weak support of the hypothesis is the relatively small number of participants in each group when a median split is used. Had a larger number of participants been used, more of the differences might have been significant. With this relatively small number of participants, the difference would have to be quite large to be significant.

Research Questions

Research Question 1

Vocabulary and Comprehension. The first research question asked about the relationships among prior knowledge, reading comprehension and lexical proficiency. Previous research has indicated that second language readers depend on lexical knowledge to a greater extent than on grammatical knowledge. If this is so, it would be expected that participants with better vocabularies would have better comprehension, regardless of their reading proficiency. In order to test this, partial correlations were calculated between lexical proficiency and the three measures of comprehension, controlling for proficiency, prior knowledge, and length of time in English-speaking countries. The results appear in Tables 16, 17, and 18.

	Title	Main Idea	Idea Units
Lexical	.07	.24*	.24*
Proficiency	(.07)	(.25)*	(.25)*

Table 16 — Third-order partial correlations, controlling for prior knowledge, reading proficiency, and length of time in English-speaking countries (*Gone with the Wind* passage)

* = $p < .05$ ( ) = corrected for attenuation N = 96

	Title	Main Idea	Idea Units
Lexical	.09	.21*	.45*
Proficiency	(.10)	(.22)*	(.47)*

Table 17 — Third-order partial correlations, controlling for prior knowledge, reading proficiency, and length of time in English-speaking countries (wedding passage)

* = $p < .05$ ( ) = corrected for attenuation N = 96

	Title	Main Idea	Idea Units
Lexical	.04	.17	.10
Proficiency	(.04)	(.18)	(.10)

Table 18 — Third-order partial correlations, controlling for prior knowledge, reading proficiency, and length of time in English-speaking countries (baseball passage)

* = < .05 ( )=corrected for attenuation N=96

For the *Gone with the Wind* and wedding passages, there were significant partial correlations between lexical proficiency and the main idea and between lexical proficiency and idea units recalled. There were no significant correlations for the baseball passage. These results provide some support for the idea that second language readers depend to a greater extent on lexical knowledge than on grammatical knowledge (as measured by the test of reading proficiency).

While there are significant correlations between comprehension and lexical proficiency for the *Gone with the Wind* and wedding passages, there are no significant correlations for the baseball passage. The most likely explanation for this is that the vocabulary in the baseball passage is easier than that in the other two passages. If the lexical difficulty of the passage is within the range of even the participants with lower lexical proficiency, a significant correlation would not be expected.

It is not clear why correlations between lexical proficiency and the main idea were significant but correlations between lexical proficiency and the title were not. Presumably these two questions measure the same thing — the extent to which the readers understand the overall idea of the passage. They should both be correlated with lexical proficiency. There are at least two reasons why they might not be. One is that it may be more difficult to express the overall idea of a passage in the few words allowed by a title. The question about the statement of the main idea may have been easier to respond to, since the participants were allowed up to two sentences, rather than being limited to a phrase.

Another possible explanation is that participants were sometimes unable to answer one or the other of the questions about the title and main idea due to lack of time. Though they were reminded to answer the last two questions, some participants did not allow enough time to answer both, and one could have been left blank and received a rating of zero due to lack of time rather than lack of comprehension. This would have caused the title and main idea responses to be less well-correlated than they should have been.

Median Splits for Prior Knowledge. If second language readers depend on vocabulary for comprehension, it would be expected that readers with high prior knowledge would be able to make better use of their lexical knowledge, because they should know what relationships to expect among the words that they know. In order to test this relationship, and to better understand the relationship between prior knowledge, lexical proficiency and reading comprehension, participants were divided into high and low prior knowledge groups using median splits. The results appear in Tables 19, 20, and 21.

	Title	Main Idea	Idea Units
Lexical	.05	.14	.32*
Proficiency	(.05)	(.15)	(.33)*
(High Prior Knowledge [N = 50])			
Lexical	.12	.31*	.18
Proficiency	(.13)	(.33)*	(.19)
(Low Prior Knowledge [N = 46])			

Table 19 — Third-order partial correlations, controlling for prior knowledge, reading proficiency, and length of time in English-speaking countries, with median split according to prior knowledge (*Gone with the Wind* passage)
* = $p < .05$ ( ) = corrected for attenuation

For the *Gone with the Wind* passage, for participants with high prior knowledge, the correlation between idea units and lexical proficiency was significant. For readers with low prior knowledge, the correlation between the main idea and lexical proficiency was significant. Differences between correlations were not significant.

	Title	Main Idea	Idea Units
Lexical	.32*	.33*	.56*
Proficiency	(.34)*	(.35)*	(.58)*
(High Prior Knowledge [N = 48])			
Lexical	-.06	.08	.31*
Proficiency	(-.06)	(.08)	(.33)*
(Low Prior Knowledge [N = 48])			

Table 20 — Third-order partial correlations, controlling for prior knowledge, reading proficiency, and length of time in English-speaking countries, with median split according to prior knowledge (wedding passage)
* = $p < .05$ ( ) = corrected for attenuation

For the wedding passage, for participants with high prior knowledge, correlations with all three measures of prior knowledge were significant. For participants with low prior knowledge, only the correlation with between lexical proficiency and idea units was significant. The differences between correlations were not significant.

	Title	Main Idea	Idea Units
Lexical	.23	.29*	.14
Proficiency	(.24)	(.31)*	(.15)
(High Prior Knowledge [N = 52])			
Lexical	-.22	.05	.11
Proficiency	(-.23)	(.05)	(.11)
(Low Prior Knowledge [N = 44])			

Table 21 — Third-order partial correlations, controlling for prior knowledge, reading proficiency, and length of time in English-speaking countries, with median split according to prior knowledge (baseball passage)
* = $p < .05$ ( ) = corrected for attenuation

For the baseball passage, for participants with high prior knowledge, the correlation between proficiency and the main idea was significant. None of the other correlations were significant. The difference between correlations between lexical knowledge and the title was significant at the .05 level.

Again, the results do not unequivocally indicate that participants with higher prior knowledge make better use of their knowledge of vocabulary than participants with lower prior knowledge. (This study was not, in any case, designed to deal specifically with this question.) However, there is some support for that position. Five of the correlations were significant for readers with high prior knowledge, as opposed to two for readers with low prior knowledge. There was only one case in which a correlation was significantly higher for participants with high prior knowledge than with low prior knowledge. However, of the remaining eight comparisons, six were in the predicted direction, even if the difference was not significant. This is an indication that participants with high prior knowledge are better able to make use of their lexical knowledge than participants with lower prior knowledge.

A study designed to answer this particular question might produce clearer results. For example, if participants were tested on knowledge of specific vocabulary words that appear in the passage, rather than on their lexical knowledge in general, a clearer link between knowledge of vocabulary might be able to be established.

Also, with a larger number of participants, more significant differences might be found. With this relatively small number of participants, the difference between two correlations would have to have been very large to be significant.

Research Question 2

Summary of Related Results. The second research question was related to the differences in comprehension between reading passages that require different amounts of prior knowledge. No specific analyses were done to answer this question. However, analyses done to test the hypotheses and answer the other research question do address the issues raised in the second research question. These have been dealt with in various places in this chapter. In summary, prior knowledge appears to have a greater effect on comprehension when a reading passage requires more background knowledge. This tendency is especially marked when

second language readers have lower reading proficiency. In such cases, it appears that readers use prior knowledge to compensate for their lack of reading proficiency.

It was also speculated that lexical proficiency and comprehension should be correlated, because previous research has shown that second language readers tend to depend on their lexical knowledge. This seems to be particularly true for reading passages that require prior knowledge.

Conclusion

The findings of this study supported Hypothesis 1, which stated that there would be a correlation between prior knowledge and reading comprehension, for reading passages that required more background knowledge for comprehension. Prior knowledge was a particularly strong influence for readers with lower proficiency. Reading proficiency, on the other hand, did not have a strong influence on participants' ability to understand these passages.

The second hypothesis stated that readers with high background knowledge would have a lower correlation between reading comprehension and reading proficiency than readers with low background knowledge. There was some support for this hypothesis, though it could not be unequivocally confirmed.

The first research question asked about the relationships among prior knowledge, reading comprehension, and lexical proficiency. The results indicated that there was a relationship between lexical proficiency and reading comprehension, especially for readers with high prior knowledge, for readings that required more prior knowledge. This indicates that second language readers tend to depend more on their knowledge of vocabulary than on grammatical knowledge.

The second research question asked about the differences among passages that require different amounts of prior knowledge. The results indicated that when a reading requires more prior knowledge, prior

knowledge has a greater effect on comprehension. They also indicated that differences in lexical proficiency were more important for readings that required more prior knowledge.

CHAPTER 4

IMPLICATIONS AND FUTURE RESEARCH

Introduction

The main purpose of this study was to look at the influence that content schemata have on the reading comprehension of readers of English as a second language, specifically those from East Asia. A secondary purpose of the study was to examine the relationship between vocabulary and reading proficiency. In this chapter, I will discuss the findings of this study in relation to previous studies and the implications of this study for the second language classroom. I will also discuss the limitations of this study and make some suggestions for future research.

Findings of the Study

Prior Knowledge and Comprehension

The major finding of this study was that second language readers (within the limitations discussed in the sections on limitations of this study) do make use of their prior knowledge in reading a second language passage. They appear to use background knowledge to compensate for inadequacies in reading proficiency. The findings of this study indicate that nonnative speakers make use of their prior knowledge in comprehension, just as native speakers have been shown to do (e.g., Spiro, 1980; Taylor, 1979; Langer and Nicolich, 1981; Langer, 1984; Kintsch and Greene, 1978; and Hare, 1982). The results of this study also support the findings of Johnson (1981) and Nunan (1985), whose studies indicated that the cultural background of a reading passage influenced the comprehension of nonnative readers of English.

However, these results contradict the findings of a major study by

Carrell (1983b), who found no effects for prior knowledge. The differences in the results of Carrell's study and this study may be explained in at least two ways.

As mentioned in Chapter 1, there may have been problems with the operationalization of the familiar/novel variable in Carrell's study, so that the passage that was assumed to be familiar in content may have been at least partly novel. Also, the operationalization of prior knowledge for these two studies was different. Carrell used a dichotomous operationalization in which background knowledge was manipulated by presenting or not presenting a picture and title related to the passage. However, Carrell did not use any manipulation checks, so it is not clear whether there were actual differences in background knowledge. If the participants did not understand the significance of the picture and title, they would not have had the background knowledge that the researcher assumed that they did, and there would have been participants in the background knowledge condition who did not have background knowledge. In contrast, in this study, participants' background knowledge was measured by asking them to write down what they know about various topics. Four levels of background knowledge were identified from these responses. The participants' background knowledge was measured rather than assumed. The difference in operationalizing background knowledge may help explain the differences between the results of these two studies.

Vocabulary and Comprehension

Though the study was not specifically designed to test the relationship between lexical knowledge and comprehension, the study does support previous findings by Ulijn (1981, 1984) and Cziko (1980). It appears that second language readers tend to depend on lexical knowledge, in combination with their knowledge of the relationships among lexical items specified by the schemata that they have for those content areas. A study designed to answer this particular question should produce clearer results. For example, if participants were tested on knowledge of the

specific lexical items that appear in the passage, rather than on their lexical knowledge in general, a clearer link between knowledge of vocabulary and comprehension might be able to be established.

Implications for the Second Language Classroom

This study has implications for the classroom in two areas — teaching background knowledge and teaching reading skills.

Teaching Reading Skills

The results of this study indicate that participants were able to use background knowledge in reading comprehension. However, they may not be using it as effectively as they might be. Readers with low reading proficiency seem to make better use of background knowledge than readers with high proficiency, as if use of background knowledge was a last resort when reading proficiency failed. (In contrast, studies by Eamon [1978-1979] and Taylor [1979] seemed to indicate that native language readers with high proficiency made better use of schemata than readers of low proficiency.) It appears that second language readers would benefit from some systematic teaching in the use of background knowledge in comprehension in second language reading.

Though there is no direct empirical evidence on this point, it is doubtful that the participants have been taught in any systematic way to use background knowledge. Foreign language classes in their native countries generally use grammar-translation method, which does not emphasize use of background knowledge. The reading courses that these participants took at the English Language Center sometimes made use of prereading exercises, and the teachers of these classes are generally aware of the importance of background knowledge. However, there has been little systematic effort to make students aware of how they use background knowledge outside of the classroom.

While it is easy to state that teaching students to use background knowledge in comprehension is a good idea, it is more difficult to know

whether this is actually effective and, if it is, how to go about doing it. Carrell (1985) showed that teaching students about textual schemata did improve their comprehension of reading passages with those textual schemata. However, I could not find any studies that dealt directly with teaching students to use background knowledge. Though Hudson (1982) showed that certain prereading activities (looking at pictures related to the passage, discussing with other students what they know about the topic, and privately making predictions about what the passage will be about) can improve comprehension, it is not known whether students can apply similar techniques to independent reading. Further research is needed on this topic.

Even if students can benefit from being taught to better use background knowledge, it is not known how these skills can best be taught. One possibility is to try to teach students to independently use a technique similar to the one that Hudson used. Again, further research is necessary to identify other possible techniques and to compare them to find out which is most effective.

A related area where further research is vital is materials development. Because the methods that teachers use depend heavily on the materials that they use, teaching materials that help students learn to use their prior knowledge need to be developed and tested in the classroom.

Teaching Background Knowledge

Stevens (1982), in a study using American high school students reading in English, showed that teaching background knowledge improves reading comprehension. Though I did not find any studies on nonnative readers, Carrell and Eisterhold (1983), Clarke and Silberstein (1977), and Krashen (1981) advocate teaching background knowledge in order to improve reading comprehension.

Since this study shows that readers do make use of background knowledge for comprehension, it seems logical to teach background knowledge in second language programs. Krashen (1981) advocated

what he called *narrow reading*, that is, reading within one topic area. One possibility is to present reading passages in a graded order so that students read those that require little background knowledge first and those that require more background knowledge later. The passages that are read first would provide background knowledge for later passages.

If the teacher does not have the opportunity to do narrow reading because the textbook used in the classroom contains readings on a wide variety of topics, the teacher should try to be aware of the background knowledge that might be required in a particular reading. If the students would not be expected to have that knowledge, it should be included in the students' prereading preparation. However, knowing what background students already have may be particularly difficult in classes with students from various countries.

Background information can be presented in various ways, depending on the amount of information involved and the complexity of the information. I do not know of any research on how it is best to present such background knowledge. However, based on my teaching experience, I think that a large amount of complex information might be best presented in written form. Simpler information could probably be presented orally. If some of the students have more information on a topic than others, the information might be brought out through class discussion.

Limitations of the Study

One limitation of this study is that it takes place in a testing situation, specifically a testing situation that required recall as opposed to recognition. The word "test" was avoided in hopes that participants would not try to memorize the reading passages as they read. However, since they were required to answer questions about the reading passages, the testing situation was unavoidable. It is uncertain whether the same results would apply to other situations, for example, reading for pleas-

ure or reading instructions.

Also, as part of the testing situation, participants were first asked to write down what they knew about the topics of the reading. This may have the effect of activating the schema, as Hudson's (1982) prereading activities did. However, this situation may not be entirely lacking in external validity. Readers may be reminded of what they know about a topic when they read the title of a reading passage, even if they do not write it down.

Another limitation is that the participants did the tasks within a relatively short time after reading the passage. We do not know how the passage of time might have affected the results. However, previous studies with native speakers have indicated that the effect of schema on recall strengthens over time. For example, Fass and Schumacher (1981) found that after 24 hours had elapsed, the effects of schema on recall were even stronger than they were immediately after reading the passage. Graesser, Woll, Kowalski, and Smith (1980) found that after one week had elapsed, schema effects were stronger than they were after thirty minutes had elapsed. Therefore, it is possible that the effects found in this study would have been even stronger after a period of time had elapsed.

Another limitation on this study is that only participants with relatively high proficiency in English were used. Only students in the three highest levels (out of five levels) at the English Language Center participated. Most of the remainder of the participants were regular university students. The mean number of months that the participants had been in English-speaking countries was eighteen. These participants had had considerably more exposure to English, both in written and spoken form, and had a higher proficiency in English, than the average person in their native countries. Therefore, these results can only be generalized to nonnative speakers with relatively high levels of proficiency.

Another limitation is the fact that most of the respondents were graduate students. While their reading skills in their native languages

were not actually tested, graduate students probably have above average reading skills in their native languages, which they can apply to reading in a second language. Readers with average or below average reading skills in their native language might not be as successful in using their prior knowledge in reading in a second language.

Also, caution should be exercised in generalizing these results beyond the national groups represented in this study. Students from Taiwan, Japan, Korea, and China were chosen because their native languages are not related to English, they have little exposure to English in their native countries, and, for the most part, they learned English using the grammar-translation method. The results may not generalize well to national groups with other characteristics. For example, people whose native language is related to English may respond differently.

Suggestions for Future Research

The results of this study suggest a number of directions for future study in the area of schema theory and comprehension for nonnative speakers.

Readers with Lower Proficiency

As mentioned above, both the English proficiency of the participants in this study and their reading proficiency in their native languages were relatively high. More studies should be done with participants of lower reading proficiency in English and lower reading proficiency in their native languages to see how well they use prior knowledge in reading comprehension. One difficulty with studying reading comprehension and prior knowledge with readers of low reading proficiency is that it is more difficult to measure their comprehension and prior knowledge in English. Also, it would be difficult to use the same measures across a broad range of reading proficiency.

Longitudinal Study

One characteristic of this study, which it shares with almost all studies of schema and reading comprehension, is that it examines the relationships among the variables of reading and vocabulary proficiency, comprehension, and length of time in English-speaking countries at one point in time. Using this method, it is difficult to answer questions about how ability to use background knowledge develops and changes over time. In the future, it may be useful to study the process of reading as proficiency develops over a period of time. While it may not be practical to follow participants' progress over a period of years, it might be possible to study them during, for example, the first several months that they reside in an English-speaking country.

Textual and Content Schemata

Another area of interest that has not been studied empirically to any great extent is the interaction between textual and content schemata. Many studies related to schemata have dealt either with textual schemata or content schemata, but not both. It would be useful to know to what extent content schemata contribute to comprehension of rhetorical patterns, and to what extent information from rhetorical patterns contributes to comprehension of content.

Classroom Application

As Carrell (1986) pointed out, little of the research done on schema theory and second language reading has been done on classroom issues or under classroom conditions. As I discussed in the section on implications for the classroom, more research is necessary in the classroom to see whether teaching background knowledge and teaching students to use background knowledge is helpful. One particular area where more research is necessary is that of materials development.

Measurement Issues

Measurement of Required Background Knowledge. The method of measuring background knowledge required for comprehension of a passage used in this study should be compared with other methods of measuring background knowledge. As mentioned in the first chapter, another possible method would be to ask proficient nonnative readers with little knowledge of the topics of the passages to rate them according to how difficult they seemed.

Comparisons of Ranges of Background Knowledge and Information in Passages. In this study, an alternative explanation for the lack of correlation between prior knowledge and comprehension for the baseball reading was that the information was basic enough that it was within the range of knowledge of most of the participants. One simple way to measure this would be to have raters underline the pieces of information in the passage that they already knew. The number of pieces of information not underlined could be compared for different readings and used as a variable in studies of prior knowledge and comprehension.

Activation of Schemata

Studies have been done on the activation of schemata in reading, using native speakers (e.g., Anderson and Pichert, 1978), but none have been done on nonnative speakers. Using techniques that have been developed to study reading in native speakers, it would be useful to learn more about the activation of schemata in nonnative speakers.

Conclusion

This study was designed to look at the relationships between prior knowledge and comprehension for East Asian nonnative speakers of English. The study showed correlations between reading and comprehension for reading passages that required background knowledge for

comprehension. There was indication that readers of low proficiency, in particular, compensated for their lack of proficiency by using their prior knowledge.

These conclusions led to suggestions for classroom applications and future research. However, many issues in the field of reading and schemata are unresolved, particularly as they relate to second language readers. This research will hopefully lead to improvements in the teaching of reading in second language classrooms.

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APPENDIX

READING SURVEY

This is part of a study related to reading and recall. First, you will be asked to write down three things you know about each of a list of words. Then you will be asked to read three short passages and answer questions about them. You should not try to memorize the passages as you read them. Just read them as you normally would.

As you finish with each page, follow the instructions at the bottom. If you are instructed to go on to the next page, do so. If you are instructed to stop, do not go on to the next page.

If you have any questions, ask the researcher or research assistant.

Thank you for your help.

GO ON TO THE NEXT PAGE

PART I

The purpose of this section is to find out what you know about various topics. Write down three things you know about each of the following topics. If you are not able to write down a full sentence, use a phrase or a single word.

Gone with the Wind

1.

2.

3.

Scarlett O'Hara

1.

2.

3.

American Civil War

1.

2.

3.

baseball

1.

2.

3.

(baseball) pitcher

1.

2.

3.

GO ON TO THE NEXT PAGE

a run (in baseball)

1.

2.

3.

American wedding customs

1.

2.

3.

wedding vows

1.

2.

3.

wedding processional

1.

2.

3.

STOP AND WAIT FOR INSTRUCTIONS

PART IIA

Read the passage below. Read the passage as you would normally read such a passage; try to understand the meaning, but do not try to memorize.

A traditional American wedding usually lasts from twenty to forty minutes. After the mother of the bride and the parents of the groom are seated in the front pew of the church, there are often one or more solos and a greeting by the minister. This is followed by the processional, when the groom's attendants, the bride's attendants, and, lastly, the bride, enter the sanctuary. (The groom does not take part in the processional. He enters from a side door.) The bride and groom exchange vows. It is traditional to use the words, "To have and to hold from this day forward, for better, for worse, for richer, for poorer, in sickness and in health, to love and to cherish, 'til death do us part." However, in recent years, many couples have chosen to write their own vows instead, using concepts that are more personally meaningful to them. Following the vows, they exchange rings, which are considered symbols of the vows. The newly married couple leaves the sanctuary first, followed by their attendants.

STOP AND WAIT FOR INSTRUCTIONS

For each item, choose the best answer and circle the letter of that answer. Choose only one answer. Answer each question, even if you are not sure of the answer.

1. No one can *survive* for very long without water.
   a. reproduce
   b. prosper
   c. transcend
   d. exist

2. The assignment was to write a *synopsis* of our favorite novel.
   a. evaluation
   b. summary
   c. critique
   d. dramatization

3. Fashion modeling can be a *lucrative* business.
   a. ludicrous
   b. laughable
   c. profitable
   d. competitive

4. Swarms of locusts *ravaged* the crops.
   a. raided
   b. landed on
   c. flew over
   d. destroyed

5. He talked so fast that I couldn't *comprehend* what he said.
   a. hear
   b. translate
   c. understand
   d. repeat

6. All of the *tenants* in the building complained about the lack of hot water.
   a. old people
   b. landlords
   c. superintendents
   d. occupants

7. The royal *nuptials* captured the attention of the world.
   a. attendance
   b. wedding
   c. baptism
   d. event

STOP AND WAIT FOR INSTRUCTIONS

I. Write down fifteen pieces of information you remember from the passage that you read. If you are not able to explain some thing that you remember in a full sentence, use a phrase or a single word.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

II. What title would you suggest for this passage?

III. In one or two sentences, what was the main idea?

STOP AND WAIT FOR INSTRUCTIONS

PART IIB

Read the passage below. Read the passage as you would normally read such a passage; try to understand the meaning, but do not try to memorize.

Margaret Mitchell once said that *Gone with the Wind* is about the theme of survival. Because Scarlett has Gerald O'Hara's toughness, she will not be defeated by the cruel circumstances in which she finds herself. She will make the best of it. Isn't the truth rather that the war and the breakdown of the old plantation society liberate Scarlett? They enable her to do what she could never have thought of doing in the pre-war plantation society. She can live a life of her own, own property, go into business, make money. Scarlett does not do what she does after the fall of the South merely to make the best of a disadvantaged situation. She does not wish to be a lady. If we compare Scarlett of Tara with the Scarlett who married first Frank Kennedy and then Rhett Butler, and is making money and thriving in Reconstruction Atlanta, we can only recognize how far more satisfactory she finds the postwar South than the old. It is difficult to imagine what charms her life before the war would ever have held for her. They could not have come close to equalling the active life she leads in postwar Atlanta.

STOP AND WAIT FOR INSTRUCTIONS

8. His *tenacious* personality made him top salesperson in the company.
   a. tenable
   b. explosive
   c. persistent
   d. charming

9. Some voters are easily swayed by *glib* politicians.
   a. smooth-speaking
   b. handsome
   c. dishonest
   d. gray-haired

10. He had reached the *zenith* of his career.
    a. ambition
    b. zeal
    c. happiest moment
    d. highest point

11. Frequent minor *ailments* kept her home from work.
    a. irritations
    b. children
    c. sicknesses
    d. falls

12. *Participants* from 100 countries go to the Olympic Games.
    a. people who represent
    b. people who come
    c. people who take part
    d. people who are athletes

13. Her action *infuriated* him.
    a. saddened
    b. intoxicated
    c. angered
    d. frightened

14. City dwellers are *exhilarated* by country air.
    a. amazed
    b. fanned
    c. humbled
    d. stimulated

STOP AND WAIT FOR INSTRUCTIONS

I. Write down fifteen pieces of information you remember from the passage. If you are not able to explain something that you remember in a full sentence, use a phrase or a single word.

1.

2.

3.

4.

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6.

7.

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15.

II. What title would you suggest for this passage?

III. In one or two sentences, what was the main idea?

STOP AND WAIT FOR INSTRUCTIONS

PART IIC

Read the passage below. Read the passage as you would normally read such a passage; try to understand the meaning, but do not try to memorize.

Baseball is a sport that is so popular in the United States that it is often called the national pastime. Every spring and summer, millions of people throughout the US play this game. Millions also watch baseball games and closely follow the progress of their favorite teams and players.

A baseball game is played on a large field between two teams of 9 or 10 players each. The teams take turns at bat (on offense) and in the field (on defense). A player of the team in the field, called the pitcher, throws a baseball toward a player of the team at bat, called the batter. The batter tries to hit the ball with a bat and drive it out of the reach of the players in the field. By hitting the ball, and in other ways, player can advance around the four bases that lie on the field. A player who does so scores a run. The team that scores the most runs wins the game.

STOP AND WAIT FOR INSTRUCTIONS

15. They swept across Europe and *ruthlessly* killed all in their path.
    a. stopping
    b. weapons
    c. without warning
    d. without pity

16. It was *inevitable* that women would be sent into space along with men.
    a. unlikely
    b. fantastic
    c. influential
    d. unavoidable

17. Americans were *appalled* by the latest statistics.
    a. surprised
    b. informed
    c. dismayed
    d. pleased

18. As she aged, she became more *garrulous*.
    a. talkative
    b. gracious
    c. sickly
    d. grey

19. Obviously Helen's *forte* is chemistry.
    a. fortitude
    b. talent
    c. weakness
    d. fixation

20. The *interment* took place last Friday.
    a. festivity
    b. installation
    c. launching
    d. burial

STOP AND WAIT FOR INSTRUCTIONS

I. Write down fifteen pieces of information you remember from the passage. If you are not able to explain something that you remember in a full sentence, use a phrase or a single word.

1.

2.

3.

4.

5.

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10.

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12.

13.

14.

15.

II. What title would you suggest for this passage?

III. In one or two sentences, what was the main idea?

STOP AND WAIT FOR INSTRUCTIONS

PART III

Read the passage that follows. For each blank, select one choice that is most natural and accurate, and circle that word. In order to determine the correct answer, you may need to read ahead a sentence or two or go back a sentence or two and re-read. If you are not sure of the correct answer, try to make a good guess.

EXAMPLE:

Students from all over the world go to universities for advanced courses in their fields of study. Most of these _1_ are intelligent and eager to study.

1. courses they (students) college

ELEANOR ROOSEVELT

Eleanor Roosevelt was born in New York City on October 11, 1884. She had a rather unhappy childhood. Her parents died, and she lived with her grandmother, who was _2_ strict and stern. Eleanor had _3_ friends her own age. When she _4_ fifteen, her grandmother sent her to Allenswood, _5_ school in England. Eleanor worked hard _6_ was soon ranked among the best _7_ at Allenswood.

During _8_ summer of 1902, Eleanor returned to New York. Three years _9_, she married her cousin, Franklin D. Roosevelt.

2. because some quite little
3. from one no none
4. should was even are
5. went summer the a
6. for and because she
7. lovely teachers for students
8. here the when lovely
9. there later ago from

GO ON TO THE NEXT PAGE

In 1928, he was __10__ Governor of New York. During their __11__ in the Governor's mansion, Eleanor often __12__ speeches for her husband, and she __13__ to help the unemployed obtain food and jobs.

__14__ her husband was elected President of the United States, Eleanor moved her __15__ into the White House and took __16__ the duties of First Lady. She became widely known through her __17__ and writing.

Eleanor might have retired from public __18__ after her husband's death on April 12, 1945, __19__ she continued to speak and give __20__ to others through her many activities.

When Eleanor Roosevelt died on November 7, 1962, the __21__ of the world mourned their loss. Her concern for the welfare of all people had earned her the title "First Lady of the World."

10. realized seemed elected sentence
11. son minute hello years
12. giving made carefully said
13. tried watch had been living
14. Therefore When More Constantly
15. since sale family step
16. on similar very for
17. superb sing lectures TV
18. since because life help
19. also but going famous
20. request infer inspiration offer
21. people quality leader quite

GO ON TO THE NEXT PAGE

PART IV

Please answer the following questions.

1. Are you _____?
   a. male
   b. female

2. What country are you from?
   a. PRC
   b. Korea
   c. ROC
   d. Japan
   e. the US
   f. other (specify) _____

3. Are you a student?
   a. yes
   b. no

   If you are an English Language Center or Haslett Adult Education student, what level are you at?

   If you are a regular university student, what is your major?

   If you are not a student, what are you doing?

4. How old are you?
   a. 17 to 19 years old
   b. 20 to 22 years old
   c. 23 to 25 years old
   d. 26 to 28 years old
   e. 29 to 31 years old
   f. 32 to 34 years old
   g. 35 to 37 years old
   h. more than 38 years old

5. How long have you been in the US or another English-speaking country?
   _____ years and _____ months

6. How long have you studied English (both in the US and your native country)?
   a. less than 6 years
   b. 6 to 7.5 years
   c. 7.5 to 8.5 years
   d. 8.5 to 9.5 years
   e. more than 9.5 years

7. Are you _____?
   a. an undergraduate student
   b. a graduate student

ABOUT THE AUTHOR

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